

REMARKS

This response is offered in reply to the office action of June 27, 2005. A petition and fee for a one month time extension are enclosed.

In response to paragraph 1 of the office action, Applicants have amended claims 5 and 9 in a manner to overcome the objection.

Reconsideration of the objection to claims 5 and 9 is requested.

In paragraph 3 of the office action, claims 9-11 are rejected under 35 USC 112, 2nd paragraph as indefinite.

Applicants have amended claim 9 in a manner to overcome the Section 112 rejection.

Reconsideration of the Section 112 rejection of claims 9-11 is requested.

In paragraph 5 of the office action, claims 1-4, 9-11, 17, and 18 are rejected as anticipated under 35 USC 102(b) in view of the Wukusick patent (US Patent 5 100 484).

Applicants describe on pages 2-3 of their specification problems first discovered by them of metallic surface scale formation during single crystal solidification processing to make single crystal castings and of deleterious extraneous grain recrystallization during a solution heat treatment of such castings.

Applicants have amended claims 1 and 9 to positively recite a method to reduce formation of a metallic surface scale that includes one or more of a eutectic phase or secondary alloy phase metallurgically bonded to the casting and have amended claim 17 to positively recite a method to reduce grain recrystallization.

The '484 patent fails altogether to recognize the problems of such metallic surface scale formation during single crystal solidification processing to make single crystal castings wherein the metallic surface scale includes one or more of a eutectic phase or secondary alloy phase metallurgically bonded to the casting and of deleterious extraneous grain recrystallization during a solution heat treatment of such castings or to provide a method of solving such problems.

The '484 patent fails altogether to provide a method solution to the problems of such metallic scale formation and such deleterious extraneous grain recrystallization.

There is no disclosure whatsoever in the '484 patent of Applicants' claimed methods.

The failure to recognize the above problems and provide a method solution thereto is apparent in the Wukusick alloy composition referred to by the Examiner. In particular, the Wukusick alloy composition is expressly taught to include 0-0.07 weight % C. This range of C concentration of Wukusick expressly teaches that carbon is not even required as an alloying element in the alloy composition. That is, a carbon concentration of zero (0) weight % is taught by the '484 patent as being acceptable.

The '484 patent fails to teach that there is any benefit to adding carbon to overcome the above discussed problems of as-cast metallic surface scale and grain recrystallization. The patent is in contrast to Applicants' claimed invention and Applicants' Figures 1A, 1B, 1C and Figure 2, which illustrate substantial reduction of the as-cast metallic surface scale on single crystal castings by virtue of addition of a high enough carbon concentration. The patent also is in contrast to the data in Applicants' specification pages 11 and 12 which illustrate substantial reduction of extraneous recrystallized grains in single crystal castings by virtue of addition of a high enough carbon concentration.

Although the '484 patent discusses alloy chemistries, heat treatments and mechanical properties, the patent nowhere recognizes the above discussed problems or provides Applicants' method solutions to the problems as set forth in Applicants' claims.

Applicants' claims 9-11 recite controlling the C concentration pursuant to the equation set forth in claim 9 to substantially reduce the as-cast metallic surface scale on a single crystal casting. The '484 patent is utterly silent with respect to controlling C concentration in the recited manner to solve the above discussed problem of the metallic surface scale on a single crystal casting.

Applicants are the first to recognize the problems of the aforementioned metallic surface scale formation during single crystal solidification processing to make single crystal castings and of deleterious extraneous grain recrystallization during a solution heat treatment of such castings. But for Applicants' disclosure, one skilled in the art is not taught by the '484 patent such problems or methods for solving them.

Furthermore, if one skilled in the art were to look at the express disclosure of the '484 patent, one skilled in the art would conclude that C is not even required as an alloying element in the alloy composition. That is, a carbon concentration of zero (0) weight % is taught by the '484 patent as being acceptable and provides no disclosure whatsoever of Applicants' claimed invention reciting the above-discussed problems and a method solution to them.

Reconsideration of the Section 102(b) rejection of Applicants' pending method claims 1-4, 9-11, 17, and 18.

In paragraph 6 of the office action, claims 1-20 are rejected as anticipated under 35 USC 102(b) in view of the Mihalisin US Patent 5 549 765.

This rejection is believed to be in error.

Firstly, Applicants have amended claims 1, 5, and 9 to positively recite a method to reduce formation of the metallic surface scale including one or more of a eutectic phase or secondary alloy phase metallurgically bonded to the casting and have amended claim 17 to positively recite a method to reduce grain recrystallization.

Secondly, the '765 patent fails altogether to recognize the problems of formation of the aforementioned metallic surface scale during single crystal solidification to make single crystal castings and of deleterious extraneous grain recrystallization during a solution heat treatment of such castings or to provide a method solution to such problems.

There is no disclosure whatsoever in the '765 patent of Applicants' claimed methods.

Applicants' claims 9-11 recite controlling the C concentration pursuant to the equation set forth in claim 9 to substantially reduce the as-cast metallic surface scale on a single crystal casting. The '765 patent is utterly silent with respect to controlling C concentration in the recited manner to solve the above discussed problem of metallic surface scale on a single crystal casting.

Reconsideration of the Section 102(b) rejection of Applicants' pending method claims 1-11 and 17-20 is requested.

In paragraph 8 of the office action, claims 1-20 are rejected as obvious under 35 USC 103(a) in view of the Wukusick patent (US Patent 5 100 484).

The deficiencies of the '484 patent are discussed in detail above.

Moreover, as noted above, Applicants have amended claims 1, 5, and 9 to positively recite a method to reduce formation of the metallic surface scale including one or more of a eutectic phase or secondary alloy phase metallurgically bonded to the casting and have amended claim 17 to positively recite a method to reduce grain recrystallization.

Claims 1, 5, 9 and 17 recite such a method to solve a problem (metallic scale formation in claims 1, 5, and 9 and grain recrystallization in claim 17) not disclosed by the '484 patent. Applicants' claims 3 and 6 recite that the casting is substantially free of the as-cast metallic surface scale. Applicants have substantially eliminated a problem not recognized and not solved by the '484 patent.

Applicants' claims 5, 8, and 19 recite use of a particular nickel base superalloy having a particular C concentration to overcome the above discussed problems. The Examiner refers to a C concentration of 0 to 0.07% C in the '484 patent and the preferred alloy compositions of Table I of the patent. However, Applicants note that the preferred and most preferred alloy compositions of Table I of the '484 patent recite C concentrations of 0.04 to 0.06% C and 0.05% C, respectively, for base alloys that do not overlap or approximate that set forth in Applicants' claims 5, 8, and 19. For example, the preferred alloy of Table I fails to overlap with respect to Mo, Ti, and Al and minimally overlaps with respect to Co and W. The most preferred alloy of Table I fails to overlap with respect to Cr, Co, Mo, Ti, and Al. The Examiner should not take only the carbon content out of the preferred and most preferred alloys of Wukusick Table I and attempt to meet Applicants' claim recitations of claims 5, 8, and 19 in hindsight manner.

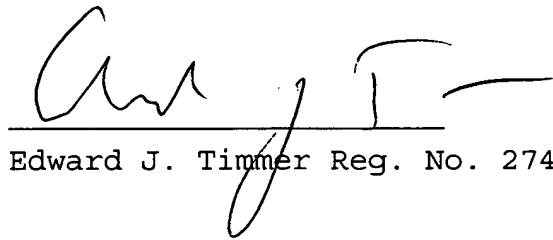
Applicants' claims 9-11 recite controlling the C concentration pursuant to the equation set forth in claim 9 to substantially reduce the aforementioned as-cast metallic scale on a single crystal casting. The '484 patent is utterly silent with respect to controlling C concentration in the recited manner to solve the above discussed problem of the metallic surface scale on a single crystal casting. The '484 patent fails to teach that there is any benefit to adding carbon to overcome the above discussed problems of the as-cast metallic surface scale and grain recrystallization.

Furthermore, if one skilled in the art were to look at the express disclosure of the '484 patent, one skilled in the art would conclude that C is not even required as an alloying element in the alloy composition. That is, a carbon concentration of zero (0) weight % is taught by the '484 patent as being acceptable and provides no suggestion whatsoever of Applicants' claimed invention reciting the above-discussed problems and a solution to them.

Reconsideration of the Section 103(a) rejection of Applicants' pending method claims 1-11 and 17-20 is requested.

Allowance of the pending method claims 1-11 and 17-20 is requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Edward J. Timmer', is written over a horizontal line.

Edward J. Timmer Reg. No. 27402

Enclosures: Postal Card

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service under 37 CFR 1.8 as first class mail in an envelope addressed to: Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on October 25, 2005.



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